WHAT IS CLAIMED IS:

1. A transport format combination indicator (TFCI) encoding apparatus in a CDMA mobile communication system, comprising:

a one-bit generator for generating a sequence having the same symbols;

a basis orthogonal sequence generator for generating a plurality of basis orthogonal sequences;

a basis mask sequence generator for generating a plurality of basis mask sequences; and

an operation unit for receiving TFCI bits that are divided into a first information part representing biorthogonal sequence conversion, a second information part representing orthogonal sequence conversion, and a third information part representing mask sequence conversion and adding an orthogonal sequence selected from the basis orthogonal sequence based on the second information part and a mask sequence selected based on the third information part.

2. The TFCI encoding apparatus of claim 1, wherein the same symbols are 1s.

3. The TFCI encoding apparatus of claim 1, wherein the plurality of basis orthogonal sequences are a first Walsh code, a second Walsh code, a fourth Walsh code, an eighth Walsh code, and a sixteenth Walsh code.

4. The TFCI encoding apparatus of claim 1, wherein the basis mask sequences includes a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

5. The TFCI encoding apparatus of claim 1, wherein the operation unit further comprises a converter for providing bi-orthogonal sequences by complementing the orthogonal sequences.

6. The TFCI encoding apparatus of claim 5, wherein the converter is an adder for adding a '1' to the symbols in each of the orthogonal sequences.

7. The TFCI encoding apparatus of claim 1, wherein the basis mask sequence length is 32 symbols .

8. The TFCI encoding apparatus of claim 1, wherein the basis mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates a column transposition function to convert the sequences in the first group into the orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group into the mask sequences .

9. The TFCI encoding apparatus of claim 8, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

10. The TFCI encoding apparatus of claim 1, wherein the operation unit comprises:

a first multiplier for multiplying the same symbols by the first information part;

a plurality of second multipliers for multiplying the basis orthogonal sequences by the respective TFCI bits representing the second information part;

a plurality of third multipliers for multiplying the basis mask sequences by the respective TFCI bits representing the third information part; and

an adder for adding the outputs of the first, second, and third multipliers .

11. A TFCI encoding apparatus in a CDMA mobile communication system, comprising:

an orthogonal sequence generator for generating a plurality of basis biorthogonal sequences;

a mask sequence generator for generating a plurality of basis mask sequences; and

an operation unit for adding a basis biorthogonal sequence and a basis mask sequence selected among the basis biorthogonal sequences and the basis mask sequences according to

TFCI bits.

12. The TFCI encoding apparatus of claim 11, wherein the plurality of basis biorthogonal sequences are a first Walsh code, a second Walsh code, a fourth Walsh code, an eighth Walsh code, a sixteenth Walsh code and an all "1" sequence which converts the orthogonal sequences to the biorthogonal sequences.

13. The TFCI encoding apparatus of claim 11, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to mask sequences.

14. The TFCI encoding apparatus of claim 11, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

15. The TFCI encoding apparatus of claim 11, wherein the operation unit comprises:

a plurality of first multipliers for multiplying the basis biorthogonal sequences by corresponding TFCI bits;

a plurality of second multipliers for multiplying the basis mask sequences by corresponding TFCI bits; and

an adder for adding the outputs of the first and second multipliers and generating the sum as the TFCI sequence.

16. An apparatus for encoding TFCI bits including first information bits and second information bits in a CDMA mobile communication system, comprising:

an orthogonal sequence generator for generating a plurality of biorthogonal sequences and outputting a biorthogonal sequence selected based on the first information bits among the plurality of biorthogonal sequences;

a mask sequence generator for generating a plurality of mask sequences and outputting a mask sequence selected based on the second information bits among the plurality of mask sequences; and

an adder for adding the biorthogonal sequence and the mask sequence received from the orthogonal sequence generator.

17. The TFCI encoding apparatus of claim 12, wherein the plurality of biorthogonal sequences are Walsh codes and bi-orthogonal complement sequences of the Walsh codes.

18. The TFCI encoding apparatus of claim 16, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

19. A TFCI encoding apparatus in a CDMA mobile communication system, comprising:

a one-bit generator for generating a sequence having the same symbols;

an orthogonal sequence generator for generating a plurality of basis orthogonal sequences;

a mask sequence generator for generating a plurality of basis mask sequences;

a plurality of multipliers as many as input TFCI bits, for multiplying the same symbols by corresponding TFCI bits, the plurality of basis orthogonal sequences by corresponding TFCI bits, and the plurality of basis mask sequences by corresponding TFCI bits; and

an adder for summing sequences received from the plurality of multipliers.

20. The TFCI encoding apparatus of claim 15, wherein the same symbols are 1s.

21. The TFCI encoding apparatus of claim 15, wherein the plurality of basis orthogonal sequences are a first Walsh code, a second Walsh code, a fourth Walsh code, an eighth Walsh code, and a sixteenth Walsh code.

22. The TFCI encoding apparatus of claim 19, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to the orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

23. The TFCI encoding apparatus of claim 19, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

24. A TFCI encoding method in a CDMA mobile communication system, comprising the steps of:

generating the same symbols;

generating a plurality of basis orthogonal sequences;

generating a plurality of basis mask sequences; and

receiving TFCI bits that are divided into a first information part representing biorthogonal sequence conversion, a second information part representing orthogonal sequence conversion, and a third information part representing mask sequence conversion and combining an orthogonal sequence selected from the basis orthogonal sequence based on the second information part, a biorthogonal sequence obtained by combining the selected orthogonal sequence with the same symbols selected based on the first information part, and a mask sequence selected based on the biorthogonal sequence and the third information part.

25. The TFCI encoding method of claim 24, wherein the same symbols are 1s.

26. The TFCI encoding method of claim 24, wherein the plurality of basis orthogonal sequences are a first Walsh code, a second Walsh code, a fourth Walsh code, an eighth Walsh code, and a sixteenth Walsh code.

27. The TFCI encoding apparatus of claim 24, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to the orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

28. The TFCI encoding method of claim 24, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

29. The TFCI encoding method of claim 24, wherein the same symbols are multiplied by the first information part, the basis orthogonal sequences are multiplied by the respective TFCI bits representing the second information part, the basis mask sequences are multiplied by the respective TFCI bits representing the third information part, and the multiplication results are summed.

30. A TFCI encoding method in a CDMA mobile communication system, comprising the steps of:

generating a plurality of basis biorthogonal sequences;

generating a plurality of basis mask sequences; and

adding a basis biorthogonal sequence and a basis mask sequence selected among the

basis biorthogonal sequences and the basis mask sequences according to TFCI bits.

31. The TFCI encoding method of claim 30, wherein the plurality of basis biorthogonal sequences are a first Walsh code, a second Walsh code, a fourth Walsh code, an eighth Walsh code, a sixteenth Walsh code and an all "1" sequence which converts the orthogonal sequences to the biorthogonal sequences.

32. The TFCI encoding apparatus of claim 30, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

33. The TFCI encoding method of claim 30, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

34. The TFCI encoding method of claim 30, wherein the basis orthogonal sequences are multiplied by corresponding TFCI bits, the basis mask sequences are multiplied by corresponding TFCI bits, and the multiplication results are added to the TFCI sequence in the TFCI sequence generating step.

35. A method of encoding TFCI bits including first information bits and second information bits in a CDMA mobile communication system, comprising the steps of:

generating a plurality of biorthogonal sequences and outputting a biorthogonal sequence selected based on the first information bits among the plurality of biorthogonal sequences;

generating a plurality of mask sequences and outputting a mask sequence selected based on the second information bits among the plurality of mask sequences; and

adding the selected biorthogonal sequence and the selected mask sequence.

36. The TFCI encoding method of claim 35, wherein the plurality of biorthogonal sequences are Walsh codes and complement codes of the Walsh codes.

37. The TFCI encoding apparatus of claim 35, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

38. A TFCI encoding method in a CDMA mobile communication system, comprising the steps of:

generating the same symbols;

generating a plurality of basis orthogonal sequences;

generating a plurality of basis mask sequences;

receiving TFCI bits and multiplying the same symbols by corresponding TFCI bits, the plurality of basis orthogonal sequences by corresponding TFCI bits, and the plurality of basis mask sequences by corresponding TFCI bits; and

adding the multiplication results.

39. The TFCI encoding method of claim 38, wherein the same symbols are 1s.

40. The TFCI encoding method of claim 38, wherein the plurality of basis orthogonal sequences are a first Walsh code, a second Walsh code, a fourth Walsh code, an eighth Walsh code, and a sixteenth Walsh code.

41. The TFCI encoding apparatus of claim 38, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first

m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to the orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

42. The TFCI encoding method of claim 38, wherein the basis mask sequences are a first mask sequence "00101000011000111111000001110111", a second mask sequence "00000001110011010110110111000111", a fourth mask sequence "00001010111110010001101100101011", and an eighth mask sequence "00011100001101110010111101010001".

43. A TFCI decoding apparatus in a CDMA mobile communication system, comprising:

a mask sequence generator for generating at least one mask sequence;

at least one operation circuit for receiving an input signal and the generated mask sequence and removing the mask sequences from the input signal by multiplying the mask sequence by the input signal; and

at least one correlator for receiving the signal from the operation circuit, calculating correlation values of the received signal with a plurality of orthogonal sequences numbered with corresponding indexes, and selecting the largest of the calculated correlation value and the orthogonal sequence index corresponding to the largest correlation value.

44. The TFCI encoding apparatus of claim 43, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

45. The TFCI decoding apparatus of claim 43, wherein the operation circuit is a multiplier.

46. The TFCI decoding apparatus of claim 43, further comprising a correlation comparator for determining the largest correlation value received from a plurality of correlators and generating an orthogonal sequence index and a mask sequence index corresponding to the largest correlation value.

47. The TFCI decoding apparatus of claim 46, wherein the mask sequence index is the index of the mask sequence used to remove a mask sequence from the input signal.

48. A TFCI decoding apparatus in a CDMA mobile communication system, comprising;

a mask sequence generator for sequentially generating a plurality of mask sequences;

an operation circuit for receiving an input signal and the mask sequences from the mask sequence generator, and removing a mask sequence form the input signal by multiplying the mask sequences by the input signal;

a correlator for receiving signals from the operation circuit sequentially, calculating correlation value of each received signal with a plurality of orthogonal sequences having corresponding indexes, and sequentially selecting the largest correlation values and an orthogonal sequence index corresponding to the largest correlation value; and

a correlation comparator for determining the highest correlation value out of the sequentially selected largest correlation values, from the correlator and outputting an orthogonal sequence index and a mask sequence index corresponding to the determined highest correlation value.

49. The TFCI encoding apparatus of claim 48, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the

sequences in the second group to the mask sequences.

50. The TFCI decoding apparatus of claim 48, further comprising a memory for storing the input signal and outputting the input signal to the operation circuit until the input signal is completely multiplied by the mask sequences generated from the mask sequence generator.

51. The TFCI decoding apparatus of claim 50, wherein the operation circuit is a multiplier.

52. The TFCI decoding apparatus of claim 48, wherein the mask sequence index is the index of the mask sequence used to remove a mask sequence from the input signal.

53. A TFCI decoding apparatus in a CDMA mobile communication system, comprising;

a mask sequence generator for sequentially generating a plurality of mask sequences;

a plurality of operation circuits for receiving an input signal and the mask sequences from the mask sequence generator and multiplying the mask sequences by the input signal;

a first correlator for calculating correlation values of the received signal with a plurality of orthogonal sequences, selecting the largest correlation value and an orthogonal sequence index corresponding to the largest correlation value;

a plurality of secondary correlators for receiving the input signal and the outputs of the operation circuits, calculating correlation values of the received signals with a plurality of orthogonal sequences having corresponding indexes, and selecting the largest correlation value and orthogonal sequences index corresponding to the largest correlation value, respectably; and

a correlation comparator for determining the highest correlation value from the selected largest correlation values received from the correlators and outputting TFCI information based on an orthogonal sequence index and a mask sequence index corresponding to the determined highest correlation value.

54. The TFCI encoding apparatus of claim 53, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the

second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

55. The TFCI decoding apparatus of claim 54, wherein the operation circuits are multipliers.

56. The TFCI decoding apparatus of claim 53, wherein the mask sequence index is the index of the mask sequence used to remove a mask sequence from the input signal corresponding to the determined correlation value.

57. A TFCI decoding method in a CDMA mobile communication system, comprising the steps of:

generating at least one mask sequence;

receiving an input signal and the mask sequence and removing a mask sequence from the input signal by multiplying the mask sequence by the input signal;

receiving the product signal, calculating correlation values of the product signal with a plurality of orthogonal sequences having corresponding indexes; and

selecting the largest correlation value from the calculated correlation values and outputting an orthogonal sequence index corresponding to the largest correlation value.

58. The TFCI encoding apparatus of claim 57, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

59. The TFCI decoding method of claim 57, further comprising the step of

determining the highest correlation value from the selected largest correlation values obtained by selecting the largest correlation value from the calculated correlation values ;

and outputting an orthogonal sequence index and a mask sequence index corresponding to the determined highest correlation value.

60. The TFCI decoding apparatus of claim 59, wherein the mask sequence index is the index of the mask sequence used to remove a mask sequence from the input signal corresponding to the highest correlation value.

61. A TFCI decoding method in a CDMA mobile communication system, comprising the steps of:

generating a plurality of mask sequences;

receiving an input signal and the mask sequences and removing a mask sequence from the input signal by multiplying the mask sequences by the input signal;

receiving the product signals, calculating correlation values of each of the product signals with a plurality of orthogonal sequences having corresponding indexes, and selecting the largest correlation values and orthogonal sequence indexes corresponding to the largest correlation values; and

determining the highest correlation value from the largest correlation values and outputting an orthogonal sequence index and a mask sequence index corresponding to the determined highest correlation value.

62. The TFCI encoding apparatus of claim 61, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

63. The TFCI decoding method of claim 61, wherein the mask sequence index is the index of the mask sequence used to remove a mask sequence from the input signal

corresponding to the highest correlation value.

64. A TFCI decoding method in a CDMA mobile communication system, comprising the steps of:

generating a plurality of mask sequences;

receiving an input signal and the mask sequences and multiplying each mask sequence by the input signal;

receiving the multiplied signals and calculating correlation values of each of the received multiplied signals with a plurality of orthogonal sequences having corresponding indexes;

selecting the largest correlation value among the calculated correlation values for each of the multiplied signals and an orthogonal sequence index corresponding to the largest correlation value; and ;

determining the highest correlation value from all of the largest correlation values and an orthogonal code index corresponding to the highest correlation value

65. The TFCI encoding apparatus of claim 64, wherein the mask sequence generator has a first m-sequence and a second m-sequence which can be added together to form a Gold code, forms a first sequence group having sequences formed by cyclically shifting the first m-sequence and a second sequence group having sequences formed by cyclically shifting the second m-sequence, generates and applies a column transposition function to the sequences in the first group to convert the sequences in the first group to orthogonal sequences, inserts a column of '0' in the front of the sequences in the second group, and generates and applies a reverse column transposition function to the sequences in the second group to convert the sequences in the second group to the mask sequences.

66. The TFCI decoding method of claim 64, wherein the mask sequence index is the index of the mask sequence used to remove a mask sequence from the input signal corresponding to the highest correlation value.

67. A mask sequence generating method for use in a TFCI encoding and decoding, comprising the steps of:

selecting a Gold sequence which is determined by adding a first m-sequence and a second m-sequence, each of the m-sequences generated by different generation polynomials;

generating a first m-sequence group by cyclically shifting the first m-sequence where the first m-sequence is shifted one to 'n' times, 'n' is a length of the first and second m-sequences and each shift of the first m-sequence produces a sequence forming the first m-sequence group;

generating a second m-sequence group by cyclically shifting the second m-sequence where the second m-sequence is shifted one to 'n' times and each shift of the second m-sequence produces a sequence forming the second m-sequence group;

determining a column transposition function that converts sequences in the first m-sequence group to orthogonal sequences;

inserting a column of '0' in the front of the sequences in the second m-sequence group;

column changing the second m-sequence group by applying the reverse function of the sequence transposition function to generate mask sequences of the TFCI coding/decoding.